REMARKS

Claims 1-16 are pending in this application. Claims 1 and 9 are amended. No claims are added, canceled or withdrawn. It is respectfully submitted that this Amendment is fully responsive to the Office Action dated April 19, 2005.

Claims 1, 2, 5, 9, 10 and 13 were rejected under 35 U.S.C. 103(a) as being unpatentable over *Knab et al.* (5,777,446) in view of *Popat* (5,760,558). Applicants amend claims 1 and 9. In view of the amendments and the following remarks, Applicants respectfully request withdrawal of the §103(a) rejection.

The above-identified application is directed to a positioning apparatus including a brushless motor having a plurality of magneto-sensitive elements and a plurality of fixed coils, a positioning mechanism to position a movable member within a predetermined movable range in accordance with rotation of the brushless motor, and a motor control circuit to rotate a rotor of the brushless motor by sequentially supplying driving pulses to the fixed coils. The motor control circuit includes driving pulse generating means to generate the driving pulses, present stage number detecting means to detect a present stage number to which a current angular position of the rotor belongs in accordance with output signals from the magneto-sensitive elements, initializing means to move the movable member to at least a forward traveling limit or a backward traveling limit within the movable range so as to set the detected present stage number as a forward traveling limit stage number or a backward traveling limit stage number when the movable member reaches the forward traveling limit or the backward traveling limit, and speed reduction means to reduce a rotating speed of the rotor by reducing power carried by

the driving pulses when the detected present stage number is equal to either one of the forward traveling limit stage number and the backward traveling limit stage number.

A positioning apparatus of the present invention thus includes a brushless motor having a plurality of magneto-sensitive elements and a plurality of fixed coils. The present stage detecting means determines an angular position of the rotor by a present or current stage number to which the angular position of the rotor belongs. The initializing means preliminarily sets forward and backward traveling limits by the corresponding stage numbers each representing the angular position of the rotor. The speed reduction means reduces the rotation speed of the rotor when the detected current stage number coincides with either one of the traveling limit stage numbers.

The apparatus according to the above-identified application thus avoids the violent collision on the basis of an expected colliding position of the movable member against the stopper that is determined by means of the present stage number to which the angular position of the rotor belongs.

To the contrary, *Knab* discloses a positioning apparatus having a single sensitive element. Since *Knab's* apparatus is provided with only one sensitive element, *Knab's* apparatus can not define a present stage number to which the angular position of the rotor belongs. *Knab's* apparatus instead counts the number of revolutions of the rotor. *Knab's* positioning apparatus thus avoids the violent collision on the basis of a distance between the movable member and the stopper that is determined by the number of revolutions of the rotor but not by the angular position thereof.

One object of the above-identified application is to provide a positioning controller in an apparatus including a motor driving unit, which can prevent damage due to the collision of a positioning stopper and a nut, *without using an additional component such as a limit switch or a position detecting sensor*. As discussed above, to accomplish this objective, the positioning apparatus of the present application comprises, in part, a brushless motor and a motor control circuit having a driving pulse generator. The drive pulse generator 25 supplies driving pulses to each of the phase coils 21-23, in accordance with the timing of a control pattern, so that the rotor rotates in the normal direction or the reverse direction depending on the type of command supplied from the micro processor 24. Accordingly, a moving direction and a moving distance (stroke) of the nut member 12 can be controlled by supplying the driving pulses to the coils 21-23 of the motor 14, in accordance with the control pattern. Also, the rotating speed of the brushless motor can be reduced by reducing the power of the driving pulse. Accordingly, by reducing the rotating speed of the brushless motor in this manner, additional components such as limit switches and detection sensors are not necessary [p. 3.]

The prior art teaches away from the claimed invention. The system disclosed in *Knab et al.* requires a signal transducer 36 which produces signals detectable by a sensor 38. In addition, an instructing step is necessary in advance to register a position data for stopping the electric motor [*see* col. 3, ll 9-50.] Accordingly, this control system suffers the same problems disclosed in the background section of the specification of the present application, namely that it becomes complicated and increases an overall system cost [p. 2.]

One of ordinary skill in the art would not have looked to the teachings of *Popat* to modify *Knab et al's* positioning device to include a brushless motor and a control circuit including a driving pulse generating means. *Knab et al.* is directed toward a drive system for the displacement of electrical windows (*Knab et al.,* col. 2, ll. 64-66); whereas *Papat* is directed toward a system for the automatic operation of Venetian blinds. Furthermore, although the *Popat* reference suggests that brushless motors could be used in their system for automatic operation of Venetian blinds, the *Papat* reference also emphasized that it would be "prohibitively expensive" to do so. Accordingly, one of ordinary skill in the art would not have looked to the teachings of *Papat* to modify *Knab et al.*

Even if one were to look to the teachings of *Papat*, the references cited by the Examiner fail to suggest the desirability of such a modification. Although the Examiner remarks that the motivation to implement a control bridge that supplies pulses to the motor is "so the motor can be driven in forward and reverse directions in a more efficient manner because drive pulses are more efficient than a constant driving signal", the references fail to teach, suggest or even hint at the desirability of such a modification.

The Examiner also rejects claims 3, 6, 8, 11, 14 and 16 under 35 U.S.C. 103(a) as being unpatentable over *Knab et al.* in view of *Popat* as applied to claims 1 and 9 and further in view of *Hill* (5,872,434). These claims depend from independent claims 1 and 9, and should likewise be allowable in light of the above comments.

Applicants appreciate the Examiner acknowledgment that claims 4, 7, 12 and 15 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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